CLAIMS

1. A procedure for controlling the temperature of at least one outbound secondary flow (2u) in a secondary circuit from a heat exchanger (1) by means of a primary flow (3) in a primary circuit, where a control unit (7) controls a regulatory member (5, 11) that regulates the primary flow,
characterised in that,

a) a parameter array, characteristic of the enthalpy difference (Δh) between the inbound primary flow (3i) to the heat exchanger (1) and the outbound primary flow (3u) from the heat exchanger (1), is determined,
b) a parameter array, characteristic of the mass flow (m_{sec}) in the secondary circuit (2), is determined,
c) a parameter array, characteristic of the mass flow (m_{prim}) in the primary circuit (3), is determined,
d) and that the parameters determined in points a) through c) are transmitted to the control unit (7) for controlling the regulatory member (5, 11), whereby the primary flow (3) is controlled in dependence of the secondary flow (2), so that the power transferred to the heat exchanger by the primary flow (3) substantially corresponds to the sum of:
    1) the power needed to raise the temperature of the secondary medium from the current inbound temperature T_{sec_in} to the desired outbound temperature $T_{sec\_out\_desired}$ and
    2) assumed power demand for compensation of stored energy in the heat exchanger (1), and
    3) assumed leak power from the heat exchanger.

2. A procedure according to claim 1,
characterised in that,
control of the regulatory member occurs through flow balancing of the primary flow (3) against the secondary flow (2) in such a way that a power balance is maintained between the primary flow (3) and the secondary flow, where the supplied and consumed power in the respective flow circuit is given by:

$Q = \rho \cdot c_p \cdot q \cdot \Delta T$, from which power balance is given that the flow on the primary side q_{prim} is obtained through control of the control member in such a way that

$$q_{prim} = \cdot q_{sek} \cdot \left(\frac{\rho_{sek} \cdot c_{P_{sek}} \cdot \Delta T_{sek}}{\rho_{prim} \cdot c_{P_{prim}} \cdot \Delta T_{prim}} \right)$$

$\rho_{sec/prim}$ = predetermined density of the medium in the secondary and the primary circuit, respectively,

$c_{psec/prim}$ = predetermined specific heat of the medium in the secondary and the primary circuit, respectively,

Q_{prim} = the flow in the primary circuit obtained from the control member

q_{sec} = actual measured flow in the secondary circuit

ΔT_{prim} = actual measured temperature difference between the inbound and outbound media on the primary side, and

ΔT_{sec} is the desired temperature difference between the inbound and outbound media of the secondary side, the temperature on the outbound side of the secondary circuit only being a desired value, whereby the control of the regulatory member is effected without direct feedback of the temperature of the outbound side of the secondary circuit.

3. A procedure according to claims 1 or 2,

characterised in that

the regulatory member (5) is constituted by a regulatory valve with known flow characteristics and by a pressure difference (pressure drop) across the regulatory valve determined by a difference pressure gauge (6).

4. A procedure according to claim 3,

characterised in that,

the degree of opening (a) of the valve is a function of the preferably empirically determined inverse flow characteristics $f_{cv}(x)$ of the valve according to:

$a = f_{cv} (q_{prim} / \sqrt{(\Delta p_{valve})})$

where Δp_{valve} is the measured differential pressure across the regulatory valve and $q_{prim\_desired}$ is the flow through the valve, and a is the degree of opening of the valve.

5. A procedure according to claims 1 or 2,
characterised in that,

the regulatory member is constituted by a pump (11) with a predetermined relationship between the flow through the same as a function of the rotational speed and differential pressure across the pump, whereby the control unit (7) regulates the rotational speed of the pump.

6. A procedure according to any of the preceding claims,
characterised in that,

the temperature (T_{sec_in}) of the inbound secondary flow (2i) to the heat exchanger is detected (10),which detected value is used for calculation of $q_{prim\_desired}$.

7. A procedure according to any of the preceding claims,
characterised in that,

the flow and temperature values in the primary and secondary circuits are used for diagnosing and detecting clogging of heat exchangers and / or impaired heat transfer value for the heat exchanger.

8. A procedure for controlling the temperature of at least one outbound secondary flow (2) from a heat exchanger (1) in a secondary circuit by means of a primary flow (3) in a primary circuit passing through the heat exchanger, where a control unit (7) controls a regulatory member (5, 11) arranged to regulate the primary flow,

characterised in that

- temperature gauges (8, 9) are arranged to measure the temperature of the primary flows inbound to (3i) and outbound from (3u) the heat exchanger (1) for determining the enthalpy difference between these flows,

- a flow gauge (4) is arranged to measure the flow (q_{sec}) of the secondary medium (2),
- difference pressure gauges (6) are arranged to measure the pressure difference (ΔP) in the primary medium (3i) across the regulatory member (5), and / or that a flow gauge (12) is arranged to measure the flow (q_{prim}) of the primary medium (3), and that
- and that the output signals from said gauges (4,8,9,12) are arranged to be transmitted to the control unit (7) for controlling the regulatory member (5, 11), whereby the primary flow (3) is arranged to be controlled in dependence of the secondary flow (2), so that the power transferred to the heat exchanger through the primary flow (3) substantially corresponds to the sum of:

1) the power needed to raise the temperature of the secondary medium from the current inbound temperature T_{sec_in} to the desired outbound temperature $T_{sec\_out\_desired}$ and
2) assumed power demand for compensation of stored energy in the heat exchanger (1), and
3) assumed leak power from the heat exchanger.

9. A device according to claim 8,

characterised in that,

the regulatory member (5) is constituted by a regulatory valve of known flow characteristics, a differential pressure gauge (6) is arranged to measure the differential pressure across the valve, and by known flow characteristics for the valve (5) stored in the memory of the control unit (7).

10. A device according to claim 8,

characterised in that,

the regulatory member is constituted by a pump (11) with a predetermined relationship between the flow through the same as a function of the rotational speed and differential pressure across the pump, whereby the control unit (7) is arranged to regulate the rotational speed of the pump.

11. A device according to claim 8,

characterised in that,

the valve (5) is integrated into a hydraulic unit (20) comprising a valve member (24) with a control member (25) acting on the same, pipe joints (22, 23) connected to the valve (5), a device for determining the differential pressure (6) across the valve member, which is connected upstream and downstream of the valve member (24), a temperature gauge (8) detecting the temperature of the flow through the valve.

12. A device according to any of claims 8 – 11,

characterised in that,

the control unit (7) comprises at least one memory (30) for storing the degree of opening (a) of the valve (5) as a function of the flow q_{sec} of the secondary circuit (2), the differential temperature ΔT_{sec} in the secondary circuit (2), the differential temperature ΔT_{prim} in the primary circuit (3), and the differential pressure ΔP_{valve} across the valve (5).

13. A device according to claim 8,

characterised in that,

channels (56 – 59) for conducting medium (3i, 3u, 2i, 2u) to and from the heat exchanger (1) are integrated into a hydraulic unit,

that the channels at their ends are equipped with pipe joints (41, 42, 45, 46, 49, 50, 51, 52) for connection to primary and secondary flow (3, 2),

that lateral channels (43, 44, 47, 48) are disbranched from at least some of the channels, which lateral channels similarly are provided with pipe joints at their ends for connection of connecting lines between several connected hydraulic units, and

that channel parts for flow, differential pressure and temperature gauges (8, 9, 10, 55, 61, 62) communicating with the channels and at least one regulatory valve are arranged in the hydraulic unit.

14. A procedure for determining the power and heat quantity transferred to a heat exchanger via the primary circuit of the heat exchanger by means of a regulatory member (5,11), regulating the flow through the primary circuit, which member (5, 11) is effectible by the control unit (7),

characterised in that,

the enthalpy difference (Δh) between the primary flow inbound to (3i) and outbound from (3u) the heat exchanger (1) is determined, that the pressure difference ($\Delta p_{regulatory\_member}$) across, and the medium temperature (T_{medium}) in, the regulatory member (5, 11) with known flow characteristics stored in the memory of the control unit (7) are determined, that the density of the primary medium is stored in the memory of the control unit (7), that the enthalpy difference (Δh), the pressure difference ($\Delta p_{regulatory\_member}$), the temperature ($T_{medium}$) and the degree of opening (a) of the regulatory member are registered, which parameters together with the flow characteristics and the density stored in the memory of the control unit, provides a value of the power and heat quantity yielded by the primary circuit.

15. A procedure according to claim 14,

characterised in that,

that the determined value of the power and heat quantity yielded by the primary circuit are checked against simultaneously valid value of the power and heat quantity absorbed by the secondary circuit, which are calculated from the parameters enthalpy difference Δh_{sec} between inbound and outbound secondary flow and flow m_{sec}, which are stored or determined in the control unit, whereby an alarm is provided to the environment via communication means if the values for power and heat quantity yielded and absorbed by the primary and secondary circuit, respectively, deviate from one another by more than a predetermined acceptable value.